



# *Guide*

## **TO BEEF CATTLE IMPROVEMENT PROGRAM**

REUBEN ALBAUGH

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## *You can improve your herds*

if you consistently select cattle that have weight for their age, grade high, and are regular producers. This circular deals with improvement programs for both purebred and commercial herds.

## *Selective breeding*

of commercial cattle is the most rapid, practical, sure, and economical method of improving quality and meat production. It accomplishes these results:

Brings about improvement, since the best bulls are mated to the best cows.

Develops uniformity in the herd.

Insures production of top replacement heifers.

Makes possible a more effective culling program.

Helps to determine the good producing bulls.

## *This circular*

simply outlines a recommended beef cattle improvement program—it is not a complete step-by-step description of the whole program. In order to carry it out you will need certain printed forms and some technical assistance from your local University of California Farm Advisor.

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### **THE AUTHORS:**

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**MARCH, 1956**

### **The cover picture**

is of California Rover II (grade 1—), used in the University herd until thirteen years old, a proven sire of high-gaining, efficient, useful offspring.



# *A Guide*

## for BEEF CATTLE

## IMPROVEMENT PROGRAMS

REUBEN ALBAUGH • HORACE T. STRONG • F. D. CARROLL

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### PUREBRED HERDS

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CALIFORNIA's record-of-performance and grading program for purebred beef cattle was originated by the late Professor H. R. Guilbert, assisted by the late Alex McDonald, long-time herdsman for the University of California, and L. H. Rochford, who was Extension livestock specialist when the program was started. Mr. Rochford is now president and general manager of the Tejon Ranch, Bakersfield—one of the largest beef-cattle operations in the state.

Professor Guilbert reasoned that if feeder and fat cattle can be graded, purebred cattle can be classified in a similar way. Observing that there was about 33 per cent difference in the price paid for a common feeder steer and that for a fancy feeder, he developed the present University of California Grading Guide (page 4)—whereby animals can be evaluated on conformation, quality, character, and type.

He used numbers rather than names for the various grades. For example, cattle that fall into the No. 1 grade correspond to fancy feeders. Under his system only those animals that would stand high in the show ring in the larger shows of the country are eligible to be graded in this bracket. They are the so-called herd-sire prospects and of course would include the top end of really good breeding cows. Guilbert put a "plus" and "minus" on the numbers in order to

represent the so-called top, medium, and low in each grade.

In addition he attached a certain percentage on each grade so that the data collected from records could be statistically analyzed. For example, a 1— animal according to this system would be 93 per cent perfect in conformation, character, and type. The other grades—2, 3, and 4—were also divided into plus and minus and were given certain percentage ratings. Thus the cattle falling into the 2 grade would correspond to a choice feeder and were given an 88 per cent rating. The 3 grade would represent a good feeder, and the 4-bracket animals would be equal to mediums.

The Score Card on page 5 was developed to supplement the Grading Guide. It lists the main points of conformation a judge would consider in judging or grading an animal.

A numerical score value is assigned each of these points. Feet and legs receive 10 points. Depth and thickness, natural fleshing, etc., are included in the Score Card and assigned a certain number of points. For example, if No. 5 animal (See Score Card, page 5) receive the number of points listed under the various headings, his total rating would be 81; or a grade of 3+.

The Score Card helps demonstrate how to grade animals and is useful for the beginner in arriving at the proper grade.

Grading is not an exact science. No instrument has yet been developed in which an animal can be placed and the exact grade recorded, but good judges of animals can readily learn to grade cattle.

Grading attempts to measure all beef cattle with the same yardstick. It differs from ordinary judging in that it classifies an animal not only in relation to the individuals in its group but also in relation to the beef-cattle population as a whole. Thus a bull grading a 2 in Colorado should grade 2 in California.

**To conduct a  
Record of Performance program . . .**

1. Enroll your herd by contacting your University of California Farm Advisor.

He will tell you what supplies you need, explain the official rules, and arrange for the first grading of the herd.

2. Supply yourself with the following:

a) An accurate breeding and calving record of the herd.

b) A herd book with a separate record sheet for each cow. (The University furnishes these record sheets.)

c) A suitable binder for the record forms. (You can buy this from most stationery stores. One such binder is the Wilson-Jones style SS slotted-lock sectional binder No. 278-31.)

d) A stock scale for weighing individuals.

**GRADING GUIDE FOR BEEF CATTLE RECORDS OF PERFORMANCE**

Grade		Breeding cattle	Market cattle	
Designation	Numerical value		Feeders	Slaughter
1 + 1 1 -	98-100 95-97 92-94	The top of the grade represents outstanding animals in strong competition. The middle and lower end of the grade represents excellent breeding animals from standpoint of type, conformation, quality, and character, capable of making a good showing in strong competition.	Strictly fancy or select	Top prime
2 + 2 2 -	89-91 86-88 83-85	Cows in grade 2 +, 2, 2 - are good enough to retain for breeding test in purebred herds. This is a practical top for commercial cattle. The top of the grade (2 +) represents the best of range bulls; the lower end, of herd bulls. Cattle in this grade are well down the line or out of the money in strong competition.	Choice	Prime to top choice
3 + 3 3 -	80-82 77-79 74-76	Cows should be culled from purebred and some commercial herds. Cows in this grade are usually the low end of commercial cattle. Bulls are rarely capable of making much improvement except on very plain cattle.	Good to medium	Choice to good
4 + 4 4 -	71-73 68-70 67	Plain, upstanding, thin-fleshed, slow-maturing cattle, lacking in quality and character, and having serious defects of conformation should be culled from commercial herds.	Medium to common	Commercial to utility

e) Standard record forms to assure uniformity.

3. Follow these rules:

a) Use a uniform system of grading, so that the animals of a certain grade will be comparable in all the herds in the state.

b) Include all herd animals over six months of age in the program. Castrated bull calves should be graded and weighed as steers.

c) All animals should be weighed and graded as calves between the ages of 6 and 8 months; yearlings between 15 and 18 months; and two-year-olds (optional) between 24 and 30 months. The final weighing and grading should take place at 4 years.

d) The recommended season for grading and weighing is when the majority of the calves are weaned (6 to 8 months). Off-season calves should be weighed by

BEEF CATTLE GRADING—SCORE CARD (Score for Animal Number)											
Points of conformation	Value	1	2	3	4	5	6	7	8	9	10
General type, appearance, and scale—weight for age*	1-10					8					
Thickness of body	1-10					8					
Depth of body	1-10					7					
Smoothness of body	1-5					4					
Natural fleshing	1-10					8					
Head	1-5					4					
Neck and shoulders	1-5					3					
Crops and ribs	1-5					3					
Loin and back	1-10					9					
Rump	1-10					9					
Round	1-10					8					
Legs and feet	1-10					10					
Total						81					

\* The following table is recommended for scoring weight-for-age on the score card.

Age	Heifers and cows	Bulls
180 days . . . . .	390 lb.	440 lb.
210 days . . . . .	440 lb.	510 lb.
240 days . . . . .	480 lb.	560 lb.
15 months . . . . .	730 lb.	1,000 lb.
25 months . . . . .	1,000 lb.	1,400 lb.
30 months . . . . .	1,030 lb.	1,450 lb.
6 years . . . . .	1,220 lb.	2,000 lb.

the breeder when weaned. They will later be officially graded.

e) The *weight* of calves raised on nurse cows is superficial and should not be used in figuring averages for the herd; but you can use their *grade* in calculating the average grade of the herd. Calves properly supplemented by creep-feeding while nursing their mothers can be included in all the records of this program. It is not permissible to use for these records the weights and grades of calves being fitted for show that have been heavily supplemented while nursing their mothers. Do not creep-feed calves unless the herd is being maintained under adverse feeding conditions.

f) Use the middle percentage of the grade in calculating the 240-day adjusted weight for calves. As an example, with a  $2+ = 91-90-89$ , use 90.

g) Birth weights of all calves are advisable.

h) Use the "Remarks" column for notes. They will be very valuable at later gradings. After regrading an animal, it is helpful to refer to previous grades and remarks.

i) An annual summary of all herds co-operating on this program should be made each year, similar to the annual summary of the cow-testing association work. It should be made by the farm advisor and a copy mailed to the livestock specialist by January 1. The information is important for evaluating the progress of this program.

### **Grading and weighing**

A good time to start the record-of-performance and grading program in a herd is when the majority of the calves are about seven months of age—usually at weaning time. Have each animal in the herd over six months weighed and graded and record the information (See Field Sheet). There is no need to weigh and grade mature animals (over four years)

except at the beginning of a program. All grading will be done by some official representatives of the University—farm advisors, livestock specialists, or animal husbandry staff members.

The farm advisor in the county where the herd is located should help the breeder fill out properly the herd book for each breeding cow, following the first weighing and grading. The book can then be turned over to the owner, and it will be largely his responsibility to record the succeeding weighings and gradings. It is highly important that this herd book be kept up-to-date.

### **Individual Life Record of Dam**

This record (see page 11) provides complete information on each cow and her production. You will see on the first part of this record sheet places to record the owner's name, the breeder's name, the average grade and weight of the cow, and her name, registration number, tattoo number, and birth weight. Space is also provided for her complete pedigree and the data on her individual weight and grade.

The second part of this sheet is the Produce Record. Here we keep information on the calves she produces. Items 1 to 12 include data of the calf from birth to weaning time. Columns 13 to 16 are for data on any of her calves that have been feed-lot tested for rate and economy of gain. Yearling data are recorded in columns 17 through 19. The Remarks column is important and should be filled with pertinent information.

The back of the record sheet is a continuation of the Produce Record. The second half is the space provided for recording breeding and calving dates.

Column 10 of the Produce Record—"Adjusted weight"—is for the purpose of comparing calf weights on an equal basis of 240 days of age, approximately eight months. The table on page 14 is

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**On pages 10 to 19 are shown the forms you will use in keeping your herd records.**



for your convenience in calculating the age of a calf in days.

For example, if a calf was born on January 4 and weaned on August 8 he would be 216 days old at time of weaning. (Subtract 4 days for January from the figure 220 under the column August, opposite the date 8.) But suppose a calf was born on November 1 and weaned on July 4 the following year, and you want its age at time of weaning. Run your finger down the July column to the fourth day, and you find the figure 185. Add this to 365 (days in a full year), getting a total of 550. Subtract 305 (found under the November column, first day), and you get 245.

**The Get of Sire Record**

This record (see page 13) is provided to record data on all calves sired by each individual bull. One sheet should be used to record all bull calves and another sheet for all heifer calves by the same sire. Information on this record sheet is the most important of all. When the data are accurately and completely recorded they can be readily used as a guide for culling and for posting data on the dam-record sheet.

On page 15 is an example of how to record data on the Get of Sire Record.

The back of the Get of Sire sheet provides a place for the sire's pedigree and other individual data, such as age, weight, and condition at the various times he has been graded and weighed. Fill out completely the Average Produce Record on the back of this sheet. You can get the data for this from the information on the front. Each item required is simple and self-explanatory.

**Feedlot-testing bulls . . .**

This is an important part of the beef-cattle improvement program. Feedlot-testing bulls for rate and efficiency of gain is a good supplement to the weighing and grading project. Bulls or heifers being tested should be full-fed after wean-

ing (average age 7 months) until they have reached a low-choice live-slaughter grade. This can be done by sire groups or individually.

Heritability for rate and economy of gain in beef cattle is high (see below). Bulls that gain rapidly and use their feed efficiently tend to sire calves that are high in these two departments of production.

**It is important** that the test be conducted carefully and accurately, since considerable cost and labor are involved. Remember too that grading and feedlot-testing cattle does not necessarily make them desirable breeding animals. Record keeping, selection, and culling are also necessary.

**Equip yourself suitably.** Good stock scales, corrals, and feeding equipment are essential. Scales should be checked by the County Sealer of Weights and Measures before weights are taken at the beginning and end of the test. Such scales may need to be tested at intervals during the feeding experiment. Corrals should be big enough so that the bulls can get proper exercise—200 square feet per bull. Feeding troughs and racks should allow ample feeding space and should be

Heritability Estimates of Traits in  
Beef Cattle

Trait	Heritability (Per cent)
Birth weight . . . . .	34
Weaning weight . . . . .	30
Final feed lot weight . . . . .	94
Gain in feed lot . . . . .	97
Efficiency of gain . . . . .	48
Birth weight . . . . .	53
Weaning weight . . . . .	28
Weight at 15 months . . . . .	86
Rate of gain on feed . . . . .	65
Weaning score . . . . .	28
Slaughter steer grade . . . . .	45
Carcass grade . . . . .	33
Area of eye muscle . . . . .	68

Source: All figures taken from Animal Breeding by L. M. Winters, page 156 (Knapp and Nordskog, 1946; Quesenberry, 1951).

constructed to minimize error from waste of feed. Some shelter may be necessary during stormy weather.

**The ration should be simple**, practical, and in keeping with feeds available. Ground barley, dried molasses beet pulp, cottonseed cake or meal, salt, and bone meal will be suitable in most areas. Hay should be part cereal and part legume. Be careful to feed high-quality hay that has a good green color to prevent Vitamin-A deficiency. Hay can be fed free choice and either chopped or long.

Here is a suggested ration:

60 lb. ground barley

30 lb. molasses beet pulp

10 lb. cottonseed cake 41-43 per cent

1 lb. salt

1 lb. bone meal

Record the weight of feed fed each group daily, and summarize actual consumption at 23- or 30-day intervals. This includes hay as well as concentrates. Feed concentrates at the rate of  $1\frac{1}{2}$  pounds of concentrate to every 100 pounds of live weight when animals are on full feed. For example, a 600-lb. bull would receive 9 pounds of concentrates per head daily. The concentrate feed should be adjusted at the beginning of each 30-day test period.

Another procedure is to maintain the same proportion of concentrate and roughage constant for all lots. This may be more desirable for standardizing the feed and interpreting the data. A good ratio would be 60 per cent concentrate, 40 per cent roughage. This avoids forcing a group with a high feed capacity to eat a larger proportion of roughage of lower nutritive value, which affects apparent over-all efficiency in terms of total feed. For the present, limit feed-lot testing to the dry lot. Feed consumed while grazing on pasture cannot be accurately measured.

**Bulls to be tested** should be of about the same age. Use only animals grading 2- and better. Weigh and grade them at the beginning of the test, which will in

most cases be after they are on full feed, or about 2 weeks after weaning. Weigh and grade carefully and uniformly.

If they have not been creep-fed, take about two weeks to bring them to full feed. Feed them twice daily, separately, by sire groups or individually. For significant results in sire groups, eight animals are about the minimum number to feed. In some cases smaller numbers may be fed.

When the bulls are on full feed at the beginning of the test, stand them overnight in a dry lot without feed or water. Weigh the next morning early (about 6 a.m.) before feeding. This will be the initial weight. At the end of the feeding tests and for each 30-day period, follow the same weighing procedure as at the beginning.

**Record both the United States Slaughter Grade and the University of California Grade.** Weigh and grade at the end of each 30 days of feeding. The grading at the beginning and end should be done very carefully; some help from a specialist may be desirable. Try to feed all the animals to the same degree of market finish, which should be the low-choice grade. Usually about a 150-day feeding period will be required to reach such a grade. Some animals finish sooner than others. If considerable variation occurs within a sire group, individuals may be removed from the test when they have attained the desired degree of finish and the remainder continued. This top-ping-out gives a truer evaluation of average efficiency because continued feeding of already fat animals will pull down the average.

At the close of the feeding test summarize the data and prepare a narrative report. Reports should be as uniform as possible. One similar to the report on the feeding test conducted in Monterey County by Albaugh, Guilbert, and Muir is a suggested sample. This report is available in each farm advisor's office. Other tables may be added. This will de-



pend on the needs of the individual, ranch, or county.

After the data have been summarized, a meeting should be held to acquaint local cattlemen with the beef-improvement program and to present the results of the experiment. Conformation and type grade should be emphasized as well as rate of gain and feed utilization.

### **Limited feeding in the bull-indexing program . . .**

The heritability of the gains made by bulls on a limited-feeding program is not known. Considerably more research needs to be done before we will know if bulls can be adequately indexed on this basis. To breeders who have expressed interest in the possibilities of limited feeding of prospective herd sires, we suggest the following method. (In this connection it is advisable to work closely with the Extension Service and the University, so that you may get as much information as possible.)

**The ultimate objective** is to determine the correlation between the gains made by a prospective herd sire on limited feeding of concentrate and the gains of his progeny on full feed. If such a correlation were high enough one might use the limited-feeding program in indexing bulls as an aid to selecting herd sires.

**The immediate objective** is to determine the variation in rates of gain and feed efficiency of limited-fed bulls. If little variation between bulls is obtained, it would be hard to select accurately the most rapidly gaining and most efficient bull. In this case it would probably be unnecessary to carry the studies further.

If, however, it is possible to obtain rather large differences in rates of gain and feed efficiency between limited-fed bulls, it would be well to pursue the problem further, to determine the capacity of

these bulls for transmitting their ability to gain.

### **Take these four steps:**

1. Select as many young bulls as possible from the progeny of one sire.
2. Feed individually if possible, using the rate given in the next paragraph.
3. Carry all bulls to the same degree of finish, probably low-good.
4. Determine the variation in rates of gain and efficiency of feed-utilization between bulls.

**The rate of limited feeding** should be—concentrate, 1.0 pound per 100 pounds of body weight; hay, free choice.

The concentrate allowance of the limited-fed bulls is enough to meet their maintenance requirement for TDN. Under such a feeding program, therefore, the ability of the bulls to utilize a high roughage-low concentrate ration is being determined. This is an important consideration in feeding ruminants.

### **Do your results justify continued study?**

If you feel that the difference in rates of gain between bulls is enough to warrant further investigation, we recommend the following steps:

1. Breed as many of the tested bulls as possible to comparable cows so that at least 10 steer progeny from each bull will be available for progeny-testing.
2. Group-feed the progeny of each sire on a full-feeding program to choice slaughter condition.
3. Keep as accurate records as possible on rates of gain and efficiency of feed utilization.
4. Make records available to the University for determination of the heritability estimates. Such estimates will enable you to determine if the gaining ability of the sire on limited feed is a good indication of the gaining ability of his progeny on full feed.

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**On pages 10 to 19 are shown the forms you will use in keeping your herd records.**



## [ 11 ]



## Reg. No.

[illegible][illegible]

[ 12 ]

## Agricultural Extension Service

Owner and Address.....

Aver. Grade of Sire.....	24	Aver. Weight.....	1,528
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[ 13 ]

## Male

## INDIVIDUAL WEIGHT AND GRADE RECORD OF HERD SIRE

Pedigree of Head Sire:		Bred by: D. V. Carithers, Mission San Jose, California	
Dandy Domino	Grade	1090961	Wt.
Blue Bell 48	Grade	1220411	Wt.
Colorado 6	Grade	1341278	Wt.
Gertrudis	Grade	1452058	Wt.
Colorado 6	Grade	1341278	Wt.
Yera Domino	Grade	1221265	Wt.
Mission Brummel	Grade	1080662	Wt.
Lady Blanchard	Grade	1470175	Wt.
Dandy Domino, 46th	Grade		Wt.
Breeder	No.	1573523	
Gertrudis 3	Grade		Wt.
Breeder	No.	1826398	
Californio Domino	Grade		Wt.
Breeder	No.	1625068	
Mission Blanch	Grade		Wt.
Breeder	No.	1755482	
Domino Prince	Grade		Wt.
Breeder	No.	2041002	
Blanch Domino	Grade		Wt.
Breeder	No.	2181823	

REMARKS:

## CHARACTERISTICS OF GET

COMPARISON BY GRADES				
Grades	Dams		Produce	
	Number	Per Cent	Number	Per Cent
1+				
1 sv.				
1—				
2+			2	28.6
2 sv.	4	57.1	3	42.9
2—	3	42.9	2	28.5
3+				
3 sv.				
3—				

### COMPARISON BY GRADES

WEANER CALVES, No. Hb.	7
Grade, Aver.	88
Weight, Aver.	504
Adj. Wt., Aver.	490
Age, Aver.	248 days
Dropped, Aver.	2/5
Daily Gain, Aver.	1.75

Superior to dams,	Number:	2	Per cent:	28.6
Equal to dams,	Number:	3	Per cent:	42.9
Inferior to dams,	Number:	2	Per cent:	28.5

Adj. Weaning Wt. of (Sex)	H	Calves of Entire Calf Crop:	507	Of this Herd
Average Grade of (Sex)	H	Calves of Intire Calf Crop:	87.1	Of this Herd
Average Grade of (Sex)	H	Calves by this Herd Sire:	88	Aver. Dam

Percentage Calf Crop for this Herd Sire: 91%

\*Genetic Grade for this Herd Sire on (sex).....89.3.....Calves:

Average to Date: 88.1

$$^2(2 \times \text{average calf grade} - \text{average dam grade}) = \text{Genetic Grade}$$

[ 14 ]



# GET OF SIRE RECORD

## Column

## Example

1. Tattoo number of calf ..... 163
2. Date of birth ..... 1/10/48
3. Birth weight ..... 65 lb.
4. Date weaned ..... 7/5/48
5. Weaning age in days (actual number of days from date of birth to weaning date). Use numerical day calendar ..... 177
6. Weight in pounds (actual weight on day of weaning) ..... 435
7. Daily gain from 70-pound birthweight (or actual birth weight) ..... 2.06

$$\frac{\text{Weaning weight (col. 5, minus 70)}}{\text{Weaning age (col. 4)}} = \text{average daily gain}$$

Example:	435		2.06
	-70		177) 365.00
	—		354
	365		—
			1100
			1062
			—
			38

8. Adjusted 240-day weaning weight ..... 564
- Average daily gain (col. 6)  $\times$  240 + 70 = adjusted 240-day weight

Example:	2.06	494
	$\times$ 240	+70
	—	—
	8240	564
	412	
	—	
	494.40	

9. Rating on weights and gain ..... -20

This is determined from the average adjusted 240-day weaning weight of either **all** of the **bull calves**, or **all** of the **heifer calves** in the herd. This average adjusted 240-day weaning weight of all bull or heifer calves is secured by:

(a) the total of the adjusted 240-day weaning weight (col. 7) for **all bull calves** in the herd, divided by the number of bull calves weighed.

or

(b) the total of the adjusted 240-day weaning weight (col. 7) for **all heifer calves** in the herd, divided by the number of heifer calves weighed.

Each individual calfweight (col. 7) is then rated a + (plus) or minus (-) with the number of pounds above or below the average adjusted 240-day weaning weight for all bull or heifer calves.

The terms “excellent” and “good” may be used for those with a plus, and “fair” or “poor” for those with a minus.

Example:

Adjusted weaning weight for entire bull calf herd	584 lb. -564 lb. adjusted weaning weight— ————— this bull calf
Rating on wts.	- 20

10. Grade (the grade given calf at weaning).

11. Grade percentage (this is the percentage value of the assigned grade).  
(Taken from grading-guide table.)

Example:

2+ =	91
2 =	88
3+ =	82

12. Days on feed ..... 120

13. Average daily gain ..... 2.2

$$\frac{\text{Total net gain}}{\text{Days on feed}} = \text{Average daily gain}$$

Example:	2.2
	120) 264.0
	240
	-----
	240
	240
	-----

14. Feed per 100 lb. gain ..... 640

$$\frac{\text{Total feed consumed} \times 100}{\text{Total net gain}} = \text{feed per 100 lb. gain}$$

Example:	640
	264) 169,000
	1,584
	-----
	1,060
	1,056
	-----
	40

1,690
× 100
-----
169,000

15. Grade ..... 2+

## Totals and Averages

### Column

2. Average calving date

From column 5, average days figures back from weaning date.

5.  $\frac{\text{Total of column}}{\text{No. of entries in column}} = \text{average weaning age in days.}$

6.  $\frac{\text{Total of column}}{\text{No. of entries in column}} = \text{average weight in pounds.}$

7.  $\frac{\text{Total of column}}{\text{No. of entries in column}} = \text{average daily gain.}$

8.  $\frac{\text{Total of column}}{\text{No. of entries in column}} = \text{average adjusted 240-day weaning weight.}$

9. Average weight column 8 compared with average of all bull (heifer) calves in herd.

13, 14, 18, 19.—See instructions for 9 and 10 above.

## ANNUAL SUMMARY

### Beef Cattle Record-of-Performance and Grading Program—19.....

1. Name of breeder .....
2. Address of breeder .....
3. Breed of cattle .....
4. Number of years records have been kept on herd .....
5. Number of cattle in the herd by age and grade:

<i>Cows</i> (2 yr. and over)	<i>Bulls</i> (2 yr. and over)	<i>Heifers</i> (2 yr. and under)	<i>Bulls</i> (2 yr. and under)
1 .....	1 .....	1 .....	1 .....
1-.....	1-.....	1-.....	1-.....
2+.....	2+.....	2+.....	2+.....
2 .....	2 .....	2 .....	2 .....
2-.....	2-.....	2-.....	2-.....
3+.....	3+.....	3+.....	3+.....
3 .....	3 .....	3 .....	3 .....



6. Animals removed from herd:

		Sold for slaughter					
	Held for range	Sold for breeding	Acct. age	Acct. quality	Acct. ancestry	Acct. health	Acct. shy breeder
Cows, 3 years and over							
2+							
2							
2-							
3+							
Heifers, 2 years and under							
2+							
2							
2-							
3+							
Bulls, 3 years and over							
2+							
2							
2-							
3+							
Bulls, 2 years and under							
2+							
2							
2-							
3+							
Castrated	Number						
2+							
2							
2-							
3+							

7. The average 240-day adjusted weight and average grade of all calves produced in 19.....

	<i>Heifers</i>	<i>Bulls</i>
Weight	.....	.....
Grade	.....	.....

8. Has the Get of Sire sheet been analyzed and supplied to the breeder by the farm advisor each year?

Yes..... No.....

9. Has the cooperator maintained a good complete herd book?

Yes..... No.....

10. Are birth weights of calves being obtained?

Yes..... No.....

11. Is any feeding program being carried out in this herd to determine rate and efficiency of gain?

Yes..... No.....

12. Will additional herds be added to the program in your county this year? If so, how many?

Yes..... Number..... No.....

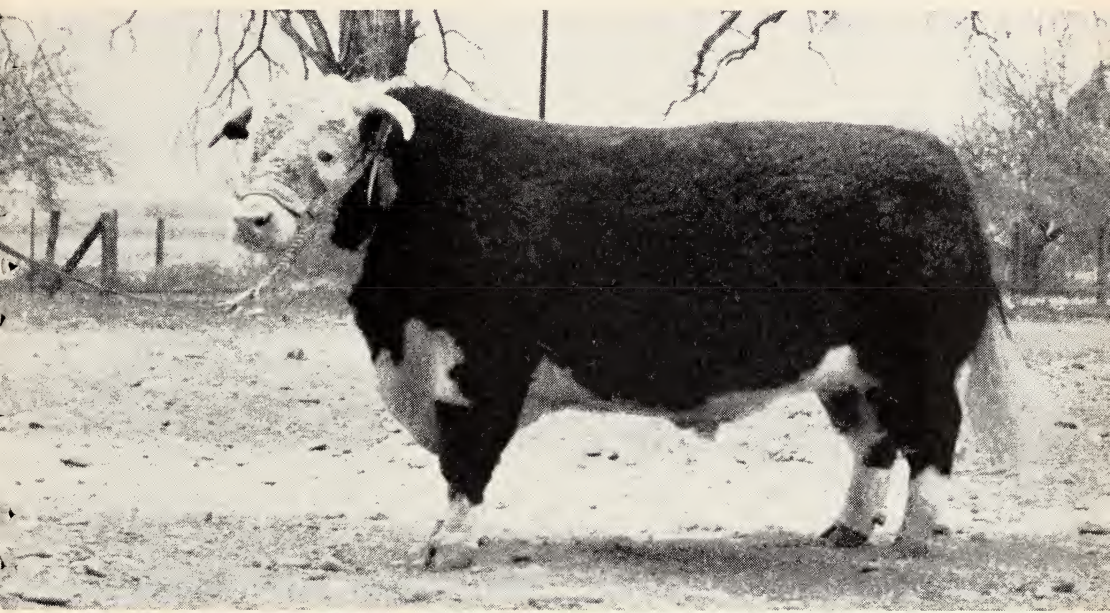
Day of any month	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1	32	60	91	121	152	182	213	244	274	305	335
2	2	33	61	92	122	153	183	214	245	275	306	336
3	3	34	62	93	123	154	184	215	246	276	307	337
4	4	35	63	94	124	155	185	216	247	277	308	338
5	5	36	64	95	125	156	186	217	248	278	309	339
6	6	37	65	96	126	157	187	218	249	279	310	340
7	7	38	66	97	127	158	188	219	250	280	311	341
8	8	39	67	9 8	128	159	189	220	251	281	312	342
9	9	40	68	99	129	160	190	221	252	282	313	343
10	10	41	69	100	130	161	191	222	253	283	314	344
11	11	42	70	101	131	162	192	223	254	284	315	345
12	12	43	71	102	132	163	193	224	255	285	316	346
13	13	44	72	103	133	164	194	225	256	286	317	347
14	14	45	73	104	134	165	195	226	257	287	318	348
15	15	46	74	105	135	166	196	227	258	288	319	349
16	16	47	75	106	136	167	197	228	259	289	320	350
17	17	48	76	107	137	168	198	229	260	290	321	351
18	18	49	77	108	138	169	199	230	261	291	322	352
19	19	50	78	109	139	170	200	231	262	292	323	353
20	20	51	79	110	140	171	201	232	263	293	324	354
21	21	52	80	111	141	172	202	233	264	294	325	355
22	22	53	81	112	142	173	203	234	265	295	326	356
23	23	54	82	113	143	174	204	235	266	296	327	357
24	24	55	83	114	144	175	205	236	267	297	328	358
25	25	56	84	115	145	176	206	237	268	298	329	359
26	26	57	85	116	146	177	207	238	269	299	330	360
27	27	58	86	117	147	178	208	239	270	300	331	361
28	28	59†	87	118	148	179	209	240	271	301	332	362
29	29		88	119	149	180	210	241	272	302	333	363
30	30		89	120	150	181	211	242	273	303	334	364
31	31		90		151		212	243		304		365

Table for calculating number of days between two calendar dates. Its use is explained on pages 6 and 7. During a leap year, be sure to count 29 days in February.



*and here . . .*

are illustrations of the various University of California grades of beef cattle.  
Top to bottom on this page are grades 1 and 1—.











Top bull on opposite page is University of California Grade 2+.

Bull above grades 3+.

Bull at the left grades 2.

Bull at left (below) grades 2-.

Bull below (this page) grades 3-.







These thick, deep-bodied, well-grown-out heifers are a desirable type for use as replacements.

These plain, narrow, upstanding heifers are the type that should be culled from the herd.



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## COMMERCIAL HERDS

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Improvement of commercial herds by selective breeding can be based on a 100-cow herd, with 20 per cent replacement per year.

**Set up your program in this way:**

1. Pick out the top females of breeding age for the select herd.
2. Weigh and grade cows in selected herd.
3. Breed this herd in a separate field.
4. Use the best bulls you have available with the select herd.
5. Where possible select bulls for rate and efficiency of gain, as well as type, conformation, and pedigree.
6. At weaning, cull from the select herd those cows that fail to produce good-type growthy calves.
7. Also at weaning, weigh and grade the calves.
8. Make first selection of replacement heifers when they are weaned.
9. Make final selection when heifers are ready to go into breeding herd.
10. Top heifers should go to the select herd; others in the general herd.
11. The select herd may be increased in size to produce all replacements for both herds.

**The select herd**

40 cows (85 per cent calf crop) produce  
17 steers for market

17 heifers	{	8 replacement for select herd
		6 replacement for general herd
		3 for market

**The general herd**

60 cows (80 per cent calf crop) produce  
24 steers for market

24 heifers	{	6 replacement for general herd
		18 for market

**Select cows and heifers for:**

weight for age;  
good milking ability;  
regular breeding ability;  
good type and conformation;  
early maturity; and  
production of top-quality calves.

**Cull cows for:**

age;  
poor milking ability;  
irregular breeding; and  
poor type and conformation.

Selection of individual animals for replacement purposes in the breeding herd has been practiced by breeders and commercial stockmen for many years. It is the basic method by which improvement in quality and changes in the type of domestic livestock have been brought about.

This process of selection of replacement females—plus the use of better bulls and better feeding and management practices—has brought about continued improvement in the quality of cattle produced on California farms and ranges.

**Two methods may be used** in the selection of replacement females for the breeding herd.

(1) The more common method is called "mass selection" or "herd selection." All of the bulls are turned in to the breeding herd; and when the calves are weaned, the best heifers are selected out and held over for replacements. Such a program, carefully followed with top-quality bulls, provides the means for improving quality and production. However, it does not use to full advantage animals of superior breeding and quality. An exceptionally good bull, with access to the entire herd, may breed an equal number of good and poor cows. Since the calves will be like their parents, more



uniformity and better quality of offspring may be expected if breeding is restricted to a group of superior animals.

(2) The second method, which will produce the most rapid progress, is that of breeding enough of the best cows to the best bulls to supply the heifers necessary for replacement. These heifers give greater assurance of breeding true for high production. Such a method requires some planning. It may necessitate additional cross-fencing and other changes in herd management.

### **Here is a step-by-step outline to follow:**

**1. Management.** Separate, well-fenced pastures or fields holding the selected herd during the breeding season are necessary. Depending on the size of the herd, available fields, and other facilities, dividing the herd into sire groups of 20–40 cows each may be possible. Where this can be done, it will provide for a closer check on the producing ability of individual bulls.

Good feeding practices must accompany a program of selective breeding. Favor the selected herd as to feed, particularly during the breeding season. Unless replacement heifers are well grown out, they may not fully reveal their inherited abilities.

Stock scales are a good investment, since a record of weight for age is extremely helpful in a selective-breeding program.

**2. Selection of cows.** About one half of the breeding herd will be required to supply the normal heifer replacement of 20 per cent per year in the average range herd. You may wish to begin your selective breeding program with fewer top cows and gradually build up your herd with selected heifers.

Weaning time is an ideal time to make the first selection. Choose the deep-bodied, thick-fleshed cows that have raised good-quality, heavy calves and still maintain thrifty condition. Consider-

ation should also be given to lower-grading cows that produce calves above the average in weight and conformation. Regular breeding and long life are important. And while of less importance than some other factors, gentleness is an inherited quality and is reflected in the gains made by steers in the feedlot.

It is very desirable to obtain the average weight and grade of the selected cows. Cows may be weighed as a group, then each animal graded individually but without the necessity of individually identifying each one.

**3. Identification.** Selected cows should be properly identified. Some type of ear mark, wattle, or a well-applied number brand will remain as a permanent identification. Eartags are the least satisfactory as they are often pulled out and lost. At the San Joaquin Experimental Range every animal is tattooed in one ear, and the same number is branded on the hip. For example, the number 352 means the animal was dropped in 1953 and was the fifty-second animal marked. The number 352 is placed in the record book beside the birth date of the animal. Properly identified cows may be run with the entire herd except during the breeding season.

**4. Selection of the bull.** Use only top-quality range bulls grading 2 or 2+ on the select cow herd. Any information on rate and efficiency of gain and ability to sire high-quality calves should be considered very important in choosing the bull for the select cow herd. The lower-grading bulls (should not grade lower than 2-) can be used on the general herd. Rotation of bulls will help to increase the per cent calf crop.

**5. Weighing and grading calves after weaning.** Calves should be weighed and graded at weaning time as was done with the cow herd. Average group weights may be obtained, but average grades will be found by individual grading without regard to individual identification.



## **6. Checking cows after weaning.**

When the first calf crop is weaned, the cows should again be checked carefully and those that fail to produce satisfactory calves should be returned to the general

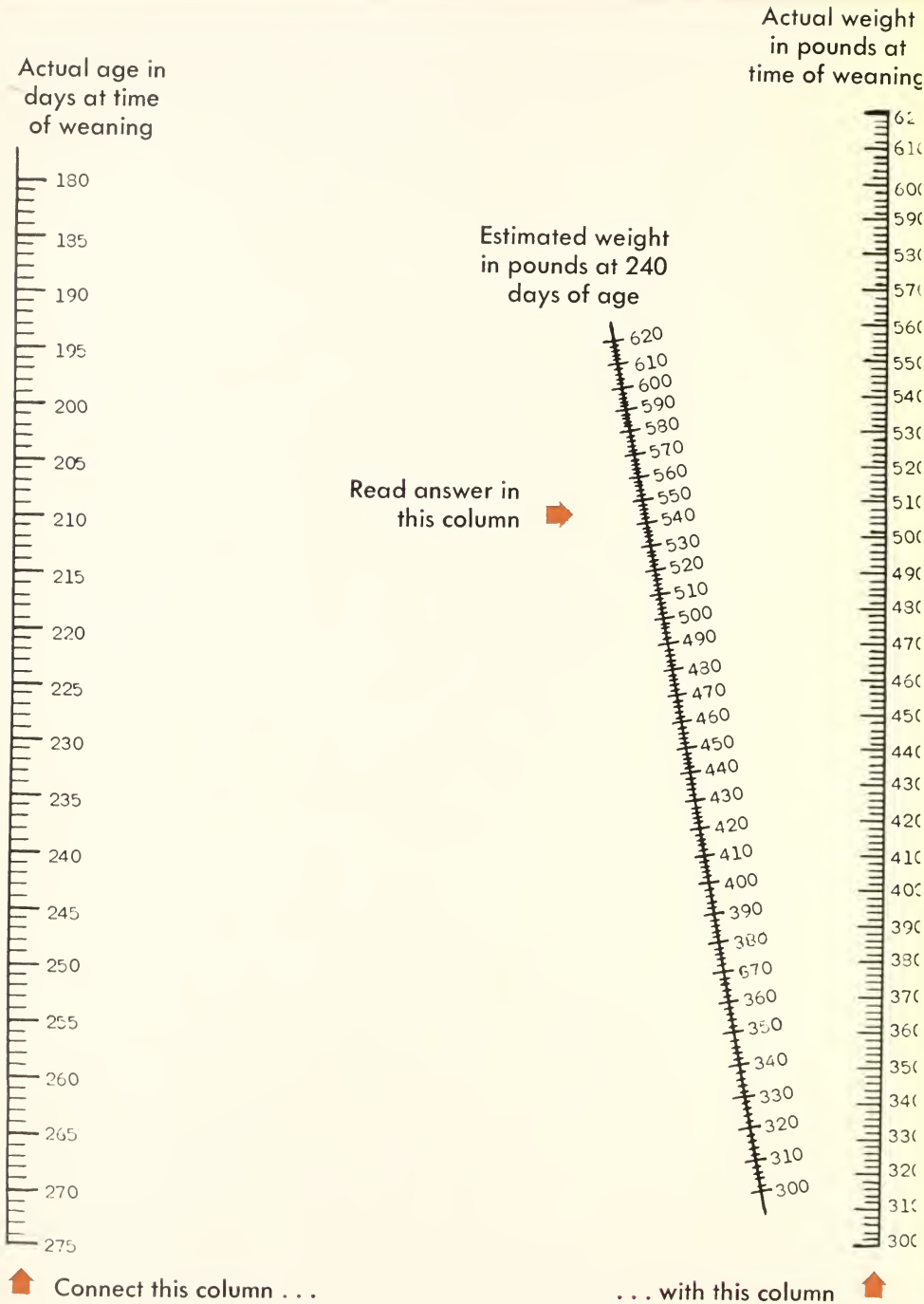
herd. The best heifer calves should be identified for replacement or for increasing the size of the selected herd. Surplus heifers can be used as replacements in the general herd.

In order that the information in our publications may be more intelligible it is sometimes necessary to use trade names of products or equipment rather than complicated descriptive or chemical identifications. In so doing it is unavoidable in some cases that similar products which are on the market under other trade names may not be cited. No endorsement of named products is intended nor is criticism implied of similar products which are not mentioned.

Co-operative Extension work in Agriculture and Home Economics, College of Agriculture, University of California, and United States Department of Agriculture co-operating. Distributed in furtherance of the Acts of Congress of May 8, and June 30, 1914. George B. Alcorn, Director, California Agricultural Extension Service.

# A simple ADJUSTED WEIGHT SCALE

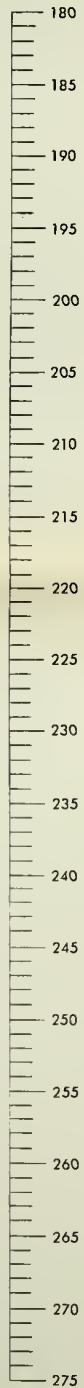
Here's a means of estimating weights of calves at a constant 240 days. Use a straight edge to connect the appropriate figures in the two outside columns . . . read the answer in the center column.



ERRATUM . . . Circular 451

Please use this scale instead of the one appearing on the back cover of Circular 451.

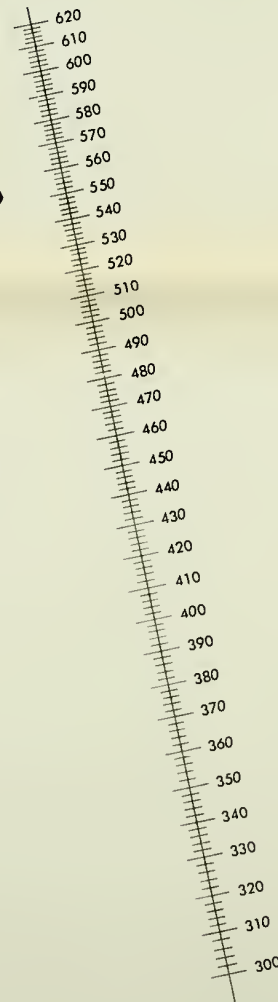
Actual age in days of time of weaning



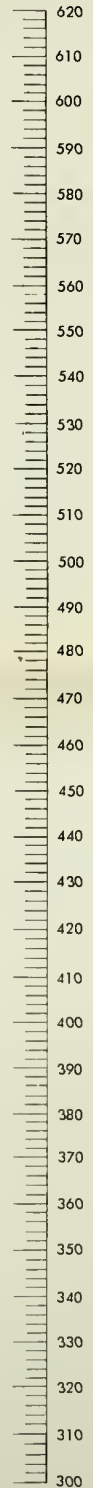
Connect this column . . .

Estimated weight in pounds at 240 days of age

Read answer in this column



Actual weight in pounds at time of weaning



. . . with this column



